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SPECIFICATION FOR BINOCULAR EYEPIECES FOR MICROSCOPE

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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March 1977

AMENDMENT NO. 1 AUGUST 1983

TO

IS:8275-1976 SPECIFICATION FOR BINOCULAR EYEPIECES FOR MICROSCOPE

Alterations

(*Page 3, clause 2.0*) - Substitute the following for the existing clause:

'2.1 For the purpose of this standard the following definition in addition to those given in IS:1399-1959* shall apply:

2.2 Field of View Number (Field Number) - Field of view number of an eyepiece is the diameter of the object in the object plane, expressed in mm.'

(*Page 5, clause 5.2.3*) - Substitute the following for the existing clause:

'5.2.3 *Field of View Number* (*Field Number*) - Field of view number of the eyepieces shall be tested according to 6.2.4 of IS:5204-1969‡.'

(EDC 36)

Reprography Unit, ISI, New Delhi, India

Indian Standard

SPECIFICATION FOR BINOCULAR EYEPIECES FOR MICROSCOPE

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Indian Standard

SPECIFICATION FOR BINOCULAR EYEPIECES FOR MICROSCOPE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 19 November 1976, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Binocular eyepiece is an attachment to a monocular microscope to present to both the eyes identical or congruent images under magnification for ease of prolonged and continuous use without imposing strain on one eye alone. The internal system is such that the beam received from the objective is separated into two by a beam splitter and the beams are brought to focii at similar heights.

1. SCOPE

1.1 This standard covers the general and functional requirements of binocular eyepieces for microscope.

2. TERMINOLOGY

2.0 For the purpose of this standard, the definitions given in IS:1399-1959* shall apply.

3. GENERAL REQUIREMENTS

3.1 The binocular eyepieces for microscope shall conform to the requirements laid down in IS:988-1959† and to the requirements given under 3 and **4.2** of IS : 2754-1964‡.

3.2 The binocular eyepieces may be attached to a microscope made according to IS:5204-1969§.

3.3 The prism arrangement is used to split the rays into two beams having equal intensity.

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*Glossary of terms used in optical technology.

†General requirements for optical components.

‡General requirements for optical instruments.

§Specification for research microscope.

3.4 The separation of the two beams is variable from 54 to 74 mm to suit interocular distance of the observer. The markings shall be painted white.

3.5 Paired eyepieces of magnifications specified in **4.9.1** of IS: 5204-1969* shall be supplied.

3.6 The case carrying the binocular eyepiece shall be made of seasoned wood or any other suitable material. A bag of reactivated silica gel shall be kept inside to keep the interior moisture free.

4. FUNCTIONAL REQUIREMENTS

4.1 The optical axis of the binocular eyepiece shall coincide with the mechanical axis of the microscope.

4.2 The image of the object as seen through the binocular eyepiece shall be well defined centrally in at least 2/3 field of view.

4.3 A dull blackened edge of a stop shall appear in focus of each eyepiece.

4.4 The binocular eyepieces shall be adjustable for negative and positive powers of the eye. The dioptric scale shall be graduated at intervals of one dioptre in one eye cup only. The graduation +5 and -5 shall be figured.

4.5 The beam splitting prism assembly shall be suitably coated to have equal illumination and colour in both eye pieces.

4.6 When the dioptric scale is set at zero, the eye cups shall be at equal heights.

4.7 Both the beams shall be parallel when they come out of the eye piece.

4.8 The magnification of each paired eyepiece shall be equal. The error, if any, shall not be more than ±2 percent of the specified value.

4.9 If desired by the purchaser, the binocular eye pieces may be of inclined type.

4.10 The optical axis of the two limbs of the binocular eyepiece shall be parallel to each other and shall be at 45° to the vertical axis.

5. TESTS

5.1 Mechanical

5.1.1 The mechanical tube length of the microscope with binocular eyepiece fitted on it shall be within ±1 mm of the standard nominal value of 160 mm.

5.1.2 Parfocality of the eyepiece shall be within one quarter of a turn of the fine motion knob.

---

*Specification for research microscope.

5.2 Optical

5.2.1 *Prisms* — Prisms to be used shall be well polished and flat without any visible defects which encroach upon the free aperture in conformity with IS:988-1959*.

5.2.2 *Paired Eyepieces* — The focal length of eyepieces shall be measured by any of the methods given in Appendix C of IS:988-1959* and the magnification shall be calculated as given in **4.2.5** of IS:2754-1964†. Two percent variation in magnification in a pair of oculars shall be allowed.

5.2.2.1 The eyepieces shall be tested for equality of illumination.

5.2.3 *Field Number* — Field number of the eyepieces shall be tested according to **6.2.4** of IS:5204-1969‡.

5.2.4 *Parallelism of Optical Axis* — The parallelism of the optical axis of the two limbs of the binocular eyepiece shall be tested by the method described in Appendix A. The adjustment of the binocular eyepieces between the interocular distances of 54 to 74 mm shall be such that the optical axis considered in the direction from the objective to the oculars shall not:

a) converge more than six minutes, or
b) diverge more than two minutes in the horizontal plane, and
c) diverge more than one and a half minutes in a vertical plane.

6. MARKING

6.1 The eyepieces shall be legibly marked with the manufacturer's name, year of manufacture and magnification.

6.1.1 The eyepieces may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. PACKING

7.1 The eyepieces shall be packed in a case and held securely in position.

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*General requirements for optical components.
†General requirements for optical instruments.
‡Specification for research microscope.

APPENDIX A

(*Clause* 5.2.4)

METHOD FOR TESTING THE PARALLELISM OF OPTICAL AXIS

A-1. The parallelism of the optical axis of the two limbs of the binocular eyepiece shall be tested as described below:

a) Remove the two eyepieces, and place a micrometer eyepiece with a scale in the right ocular.

b) Place a graticule with a cross (object graticule) in the object plane of the microscope OG and remove the parallax between the image of the object graticule and micrometer eyepiece graticule. Bring the image of the object graticule in the centre of the micrometer EP.

c) Now rotate the micrometer EP and note down the shift, if any, in a plane passing through the optical axis of the two limbs of the binocular EP.

d) Now take out the micrometer EP from the right ocular and fix it in the left ocular and find out the shift in the cross of the object graticule with respect to the centre of the micrometer EP graticule. Also find out the shift on rotation of the micrometer EP as in (c).

e) Calculate the total shift by adding the shift observed by the rotation of the micrometer EP in both the oculars to the shift observed in the image of the cross as seen in the left ocular from the centre of the micrometer EP.

(*Continued from page* 2)

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